

1

METHOD AND APPARATUS FOR CONTROLLING DATA RATE OF A REVERSE LINK IN A COMMUNICATION SYSTEM

CLAIM OF PRIORITY UNDER 35 U.S.C. §119

The present Application for Patent claims priority to U.S. patent application Ser. No. 10/628,955, entitled "Method and Apparatus for Controlling Data Rate of a Reverse Link in a Communication System," filed Jul. 28, 2003, which claims priority to Provisional Application No. 60/448,269, entitled "Reverse Link Data Communication," filed Feb. 18, 2003, and Provisional Application No. 60/469,376, entitled "Method and Apparatus for Controlling Data Rate of a Reverse Link in a Communication System," filed May 9, 2003, each of which are assigned to the assignee hereof and hereby expressly incorporated by reference herein.

FIELD

The present invention relates generally to the field of communications, and more particularly, to controlling data rate of a reverse link from a mobile station in a communication system.

BACKGROUND

In a wireless communication system, unnecessary and excessive transmissions by a user may cause interference for other users in addition to reducing the system capacity. The unnecessary and excessive transmission may be caused by inefficient selection of data rate of a reverse link in the communication system. The data communicated between two end users may pass through several layers of protocols for assuring proper flow of data through the system. Normally, a mobile station receives blocks of data from an application for transmission on a reverse link. The block of data is divided into a number of frames and transmitted over the communication link. The proper delivery of data in at least one aspect is assured through a system of checking for error in each frame of data, and requesting a retransmission of the same frame of data if an unacceptable error or error rate is detected in the frame of data. The blocks of data may be of any type, for example, music data, video data, etc. The blocks of data may have different size and different delivery requirements. Such data delivery requirements often are associated with a quality of service. The quality of service may be measured by the communication data rate, the rate of packet loss that may be acceptable to the service, consistency in time delay of the data delivery, and an acceptable maximum delay for the communication of the data. Very often, if the data rate selected for transmission is not adequate, the required packet loss and the communication delay parameters may not be achieved.

On a forward link communication, the base station very often has adequate information about forward link quality with a number of mobile stations. As such, the base station may be able to centrally manage the forward link communication data rates. However, on the reverse link, a mobile station has no information about the transmissions from other mobile stations. Therefore, the mobile station may make a request to get permission to transmit at a data rate. The base station after reviewing every mobile station requests, accepts or rejects the requested data rate. If the requested data rate is rejected, the mobile station may request a lower data rate until the base station accepts a requested data rate. The mobile station may have permission

2

to transmit below a data rate without going through the request and acceptance process. Such a data rate is normally a very low data rate. Before transmission on the reverse link, the mobile station needs to have completed its communication for the data rate request. Such overhead communications between the mobile stations and the base stations may reach an unacceptable level and impact the desired quality of service.

Therefore, there is a need to provide a system, method and apparatus for selection of a reverse link data rate in a communication system.

BRIEF DESCRIPTION OF THE DRAWINGS

The features, objects, and advantages of the present invention will become more apparent from the detailed description set forth below when taken in conjunction with the drawings in which like reference characters identify correspondingly throughout and wherein:

FIG. 1 depicts a communication system for transmitting and receiving data in accordance with various aspects of the invention;

FIG. 2 depicts a receiver system for receiving data in accordance with various aspects of the invention;

FIG. 3 depicts a transmitter system for transmitting data in accordance with various aspects of the invention; and

FIG. 3A illustrates an exemplary process for the allocation of resources in response to a data rate request.

FIG. 3B is a schematic illustrating the required and congestion data rate computations.

FIG. 3C illustrates an encoding of a 2-bit Differential Rate Request field.

FIG. 3D illustrates an alternative encoding of a 2-bit Differential Rate Request field.

FIG. 4 depicts a flow of messages and processes for determining a data rate for reverse link communication.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

One or more exemplary embodiments described herein are set forth in the context of a digital wireless data communication system. While use within this context is advantageous, different embodiments of the invention may be incorporated in different environments or configurations. In general, the various systems described herein may be formed using software-controlled processors, integrated circuits, or discrete logic. The data, instructions, commands, information, signals, symbols, and chips that may be referenced throughout the application are advantageously represented by voltages, currents, electromagnetic waves, magnetic fields or particles, optical fields or particles, or a combination thereof. In addition, the blocks shown in each block diagram may represent hardware or method steps.

More specifically, various embodiments of the invention may be incorporated in a wireless communication system operating in accordance with the code division multiple access (CDMA) technique which has been disclosed and described in various standards published by the Telecommunication Industry Association (TIA) and other standards organizations. Such standards include the TIA/EIA-95 standard, TIA/EIA-IS-2000 standard, IMT-2000 standard, UMTS and WCDMA standard, all incorporated by reference herein. A system for communication of data is also detailed in the "TIA/EIA/IS-856 cdma2000 High Rate Packet Data Air Interface Specification," incorporated by reference herein. A copy of the standards may be obtained by access-